Reimbursable Advisory Services Agreement on Public Expenditure Review in Science, Technology and Innovation and Support for Building Evidence-based Approach for the National Strategic Framework in Education 2030

Pillar 1 Bulgaria Public Expenditure Review in Science, Technology and Innovation

INCEPTION REPORT

June 24, 2020

THE WORLD BANK
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REPUBLIC OF BULGARIA
Ministry of Education and Science

OPERATIONAL PROGRAMME
SCIENCE AND EDUCATION
FOR SMART GROWTH

DISCLAIMER

This report is developed by the staff and consultants of the World Bank. The findings, interpretations and conclusions expressed in this report do not necessarily reflect the views of the Executive Directors of the World Bank or the governments they represent. The report was produced to provide advisory support for the Ministry of Education and Science (MOES) of the Republic of Bulgaria and does not necessarily represent the views of the Government of Bulgaria or of the MOES.

ACKNOWLEDGEMENTS

This report was produced by a core team which consists of Anwar Aridi (Senior Private Sector Specialist, Task Team Leader), Umut Kilinc (Economist), Daniel Querejazu (Consultant), Lyubomira Dimitrova (Consultant), and Teodora Georgieva (Consultant). Adela Delcheva provided support to the team.

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Contents

List of Abbreviations

EU	European Union
GDP	Gross domestic product
GERD	Gross expenditures on R&D
IMF	International Monetary Fund
IP	Intellectual Property
ME	Ministry of Economy
MoES	Ministry of Education and Science
OP SESG	Operational Programme Science and Education for Smart Growth
PER	Public Expenditure Review
PROs	Public Research Organizations
R&D	Research and development
RAS	Reimbursable Advisory Services
STI	Science, technology, and innovation
TFP	Total factor productivity

Introduction

Objective

This Inception Report represents the first output under the Reimbursable Advisory Services (RAS) Agreement signed between International Bank for Restructuring and Development (The World Bank) and the Ministry of Education and Science of the Republic of Bulgaria with project number P171347 to improve effectiveness of public investments for STI through reallocation of resources, redesign and rationalization of STI policies and instruments. The Agreement became effective on June 10, 2020 following the completion of national procedures for its entry into force.

The inception report marks the end of a two-week inception period.

Report overview

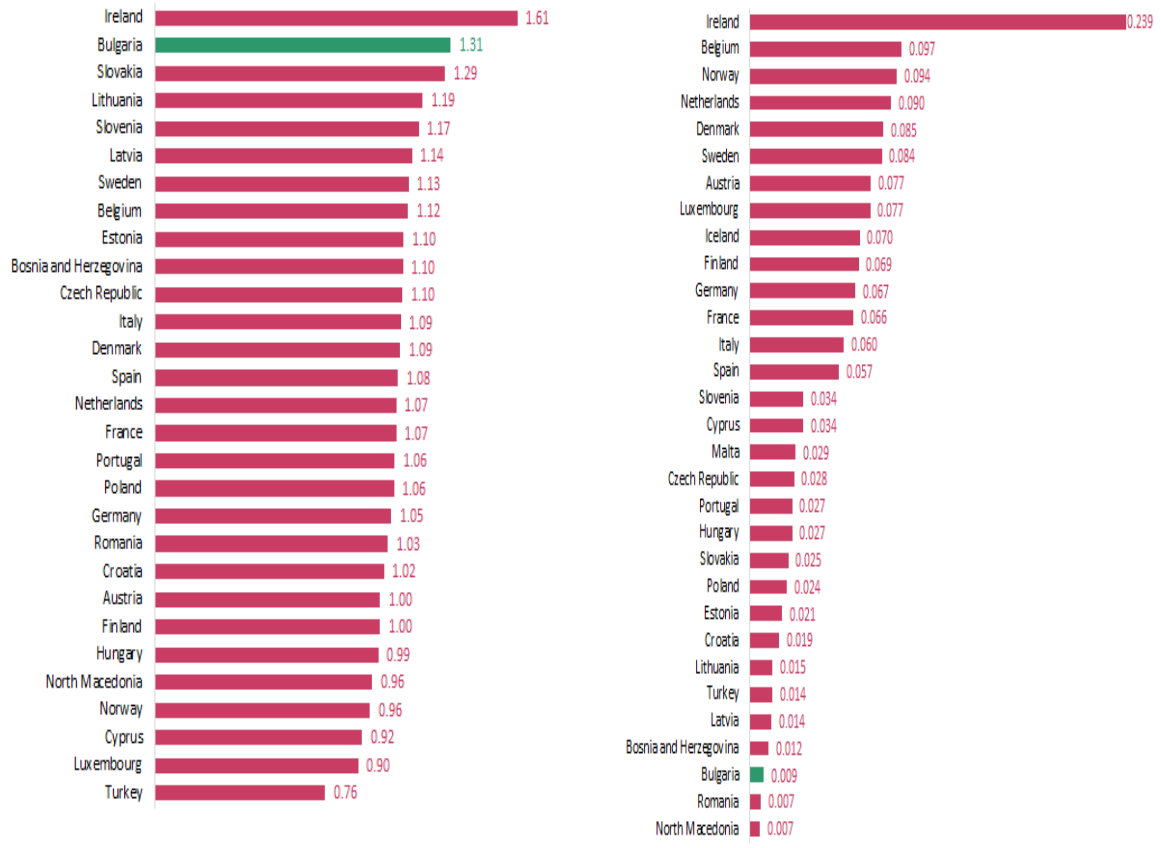
The purpose of this inception report is to: (i) ensure common understanding of the scope of the Advisory Program; (ii) provide an update of the progress made with the implementation of activities carried out during the pre-inception and inception periods; (iii) outline the proposed approach for the delivery of the Advisory Program; and (iv) present the detailed work plan and timetable for the entire period of the Advisory Program (June 2020 to March 2022).

General issues and context

Background

Bulgaria has undergone a substantial transition from a highly centralized and planned governance system to a market-oriented economy in the last three decades. During the initial phases of the transition, economic growth and restructuring was slow and combined with a low saving rate and high indebtedness. As a result, GDP was stagnated between 10 and 15 billion USD for about a ten-year period from 1990 to 2000. Structural reforms intensified in the late 1990s and the progress in the EU accession process helped the economy to take off and achieve rapid economic growth with improved living standards (World Bank, 2019). From 2000 to 2010, GDP rose from around 13 to 50 billion USD, which one of the most remarkable economic growth performances globally during this period. From 2002-2016, Bulgarian labor productivity growth in manufacturing was behind only Ireland in Europe, but despite this extraordinary growth, the country still exhibits on average one of the lowest labor productivity performances on the continent, as can be seen in Figure 1.

Figure 1: Change in Manufacturing and Labor Productivity by Country (Average labor productivity ratio of 2013-2016 over 2008-2012) and Manufacturing Labor Productivity by Country (2016)



Source: Author's calculation based on Eurostat data

Raising productivity in Bulgaria requires improving productivity across firms. A recent IMF (2019) analysis investigated some of the factors correlated with productivity growth in the country from 2003 to 2015. The study found that firms which have a larger share of innovate assets and lower financial distress have higher productivity growth. Other firm types also tend to be more productive, such as being foreign affiliated, larger, younger, and locating in tradable sectors (compared to those in the services sectors). However, productivity convergence between laggard and frontier existing firms

slowed after the global financial crisis. For example, the total factor productivity (TFP) gap in the manufacturing sector was more than double (i.e., 117%) for the median firm in 2015.

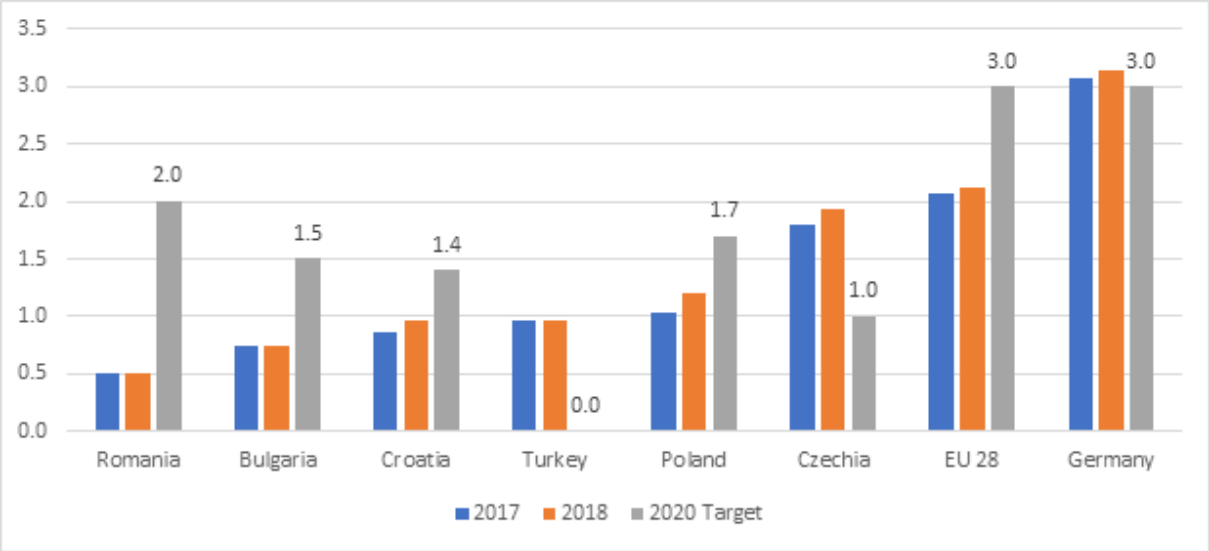
Research and Innovation performance

Bulgaria exhibits one of the lowest innovation performances in the EU due to a number of factors. Bulgaria lags behind most peers in R&D investments; innovation outputs, in terms of publications and patents, are relatively low in quantity and tend to have little impact outside of Bulgaria; and innovation outcomes, in terms of new licenses, startups, and products, are few with little evidence of successful technology transfer and commercialization of research from the public sector.

Research and Innovation Inputs

Bulgaria lags behind all of its peers except Romania in investments in R&D in terms of gross expenditure on research and development (GERD) as a percentage of GDP, which can be seen in Figure 2. GERD as a percentage of R&D has been trending down since 2015, reaching 0.7 percent in 2018. This share would need to more than double to reach Bulgaria's 2020 target and more than quadruple in order to reach its ambitious new 2030 target of three percent of GDP.

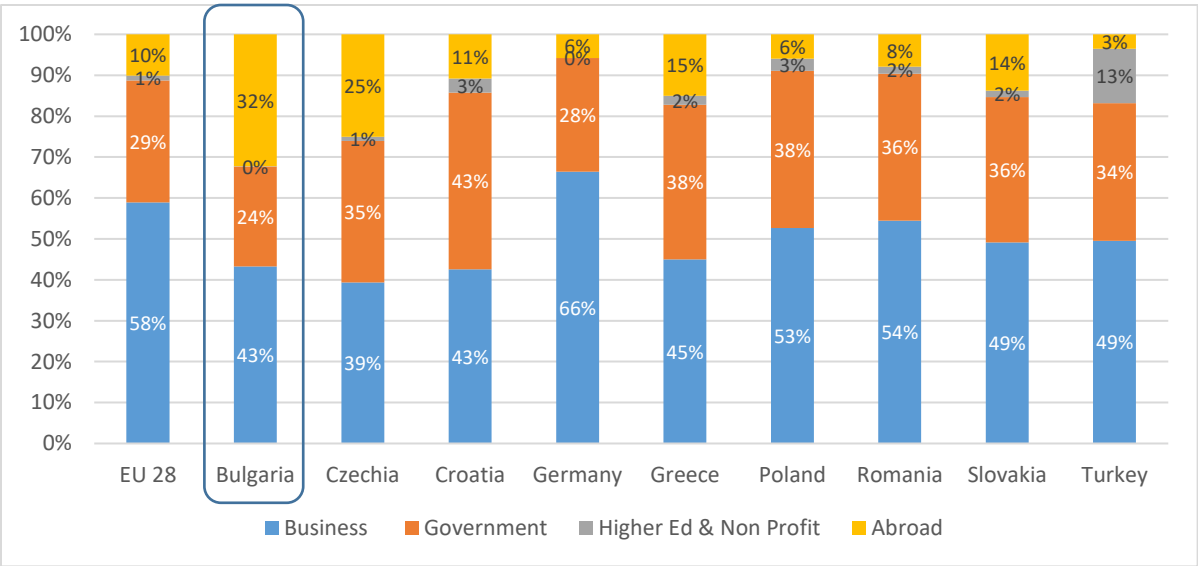
Figure 2: GERD as a percentage of GDP, 2017-2018, and 2020 target



Source: Eurostat

Breaking down the sources of R&D investments, Bulgaria had the lowest share of GERD financed by the national government among peers, as can be seen in Figure 3. Bulgaria also had the highest share of GERD financed from abroad among peers and over three times the EU average share. Closer inspection of GERD financed from abroad reveals that funding from European Structural and Investment Funds only constituted 11 percent of external R&D funding, the lowest share among peers and less than half of the EU average. This low share of funding from European Structural and Investment Funds points to challenges that Bulgaria has experienced in absorbing and implementing EU funding programs in STI.

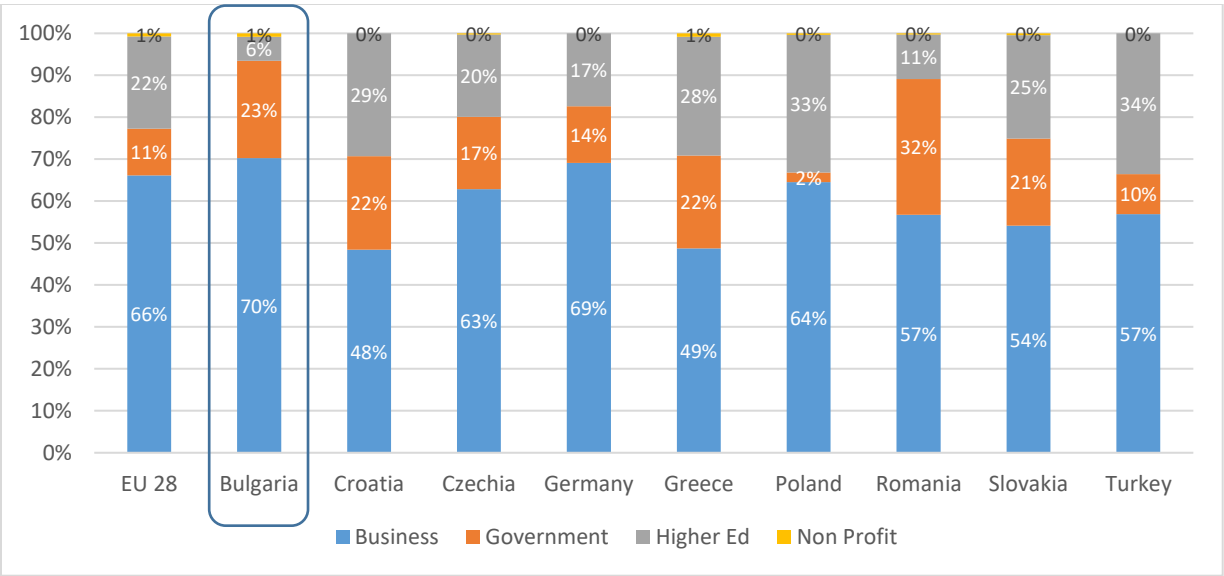
Figure 3: GERD by source of funding, 2017



Source: Eurostat

Looking at the performers for GERD, Bulgaria's institutions of higher education only performed six percent of GERD in 2017, the lowest rate among peers by far and less than a third of the EU average Because of the low contribution of Bulgaria's public research institutions to R&D performance, the business sector performed 70 percent of GERD in 2017, the highest share among peers and above the EU average of 66 percent, as can be seen in Figure 4.

Figure 4: GERD by sector of performance, 2017

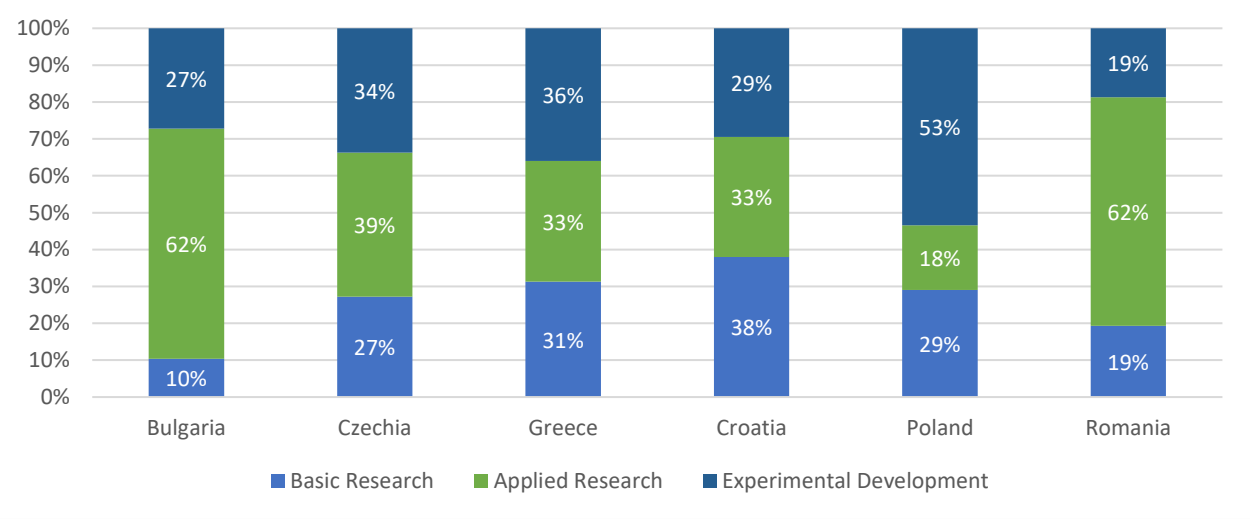


Source: Eurostat

Basic research only accounted for 10 percent of GERD in 2017, by far the lowest among peers, while applied research accounted for 62 percent of GERD, tied with Romania for the highest rate among peers (see Figure 5). This is primarily due to the very low contribution of public research institutions (HEIs and PROs) to national R&D and a correspondingly high share of GERD from the business sector. The primary funding source for basic R&D in Bulgaria is the National Science Fund (NSF). During the 2007-2013 programming period, there were no European instruments dedicated to funding basic

research in the country. Funding levels provided by the NSF are low – only enough to maintain the level of scientific activity in the Academies of Science and other public research organizations. Basic research in universities is funded by the state budget through the MoES, and, as a rule, this financing is very limited.

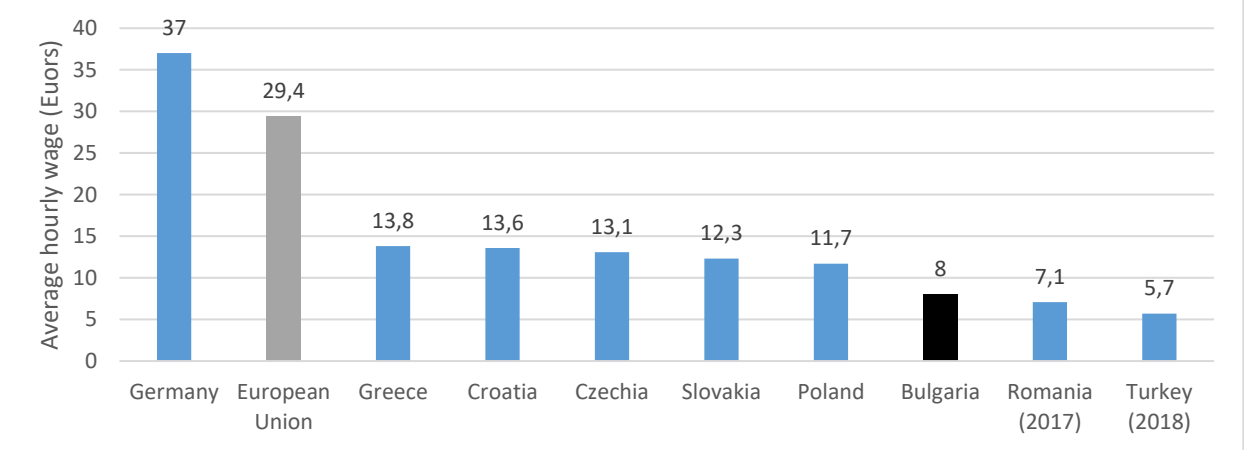
Figure 5: GERD by type of R&D, 2017



Source: Eurostat | Note: Data not available for EU 28 average, Germany, or Turkey

Low levels of government funding for research corresponds will very low average salaries for public researchers (at BAS, other PROs, and HEIs) relative to their CEE peers (Figure 6). In the 2017 Survey on Researchers in European Higher Education Institutions, Bulgarian public researchers at all career stages expressed dissatisfaction with their renumeration – sentiments which were shared by researchers in many CEE peer countries (Directorate-General for Research and Innovation, 2017). A 2015 peer review of the Bulgarian research system found that, while Bulgarian institutions have a very high level of autonomy in terms of setting salaries when compared to other EU countries, this autonomy is ineffective. The overall low level of funding for salaries give the universities/BAS no ability to use their discretion to attract researchers and reward excellence (Soete et al, 2015). The low salaries deter young Bulgarians from entering into the public research sector and contribute to the ongoing brain drain of research talent from the country.

Figure 6: Average public researcher salaries, 2019



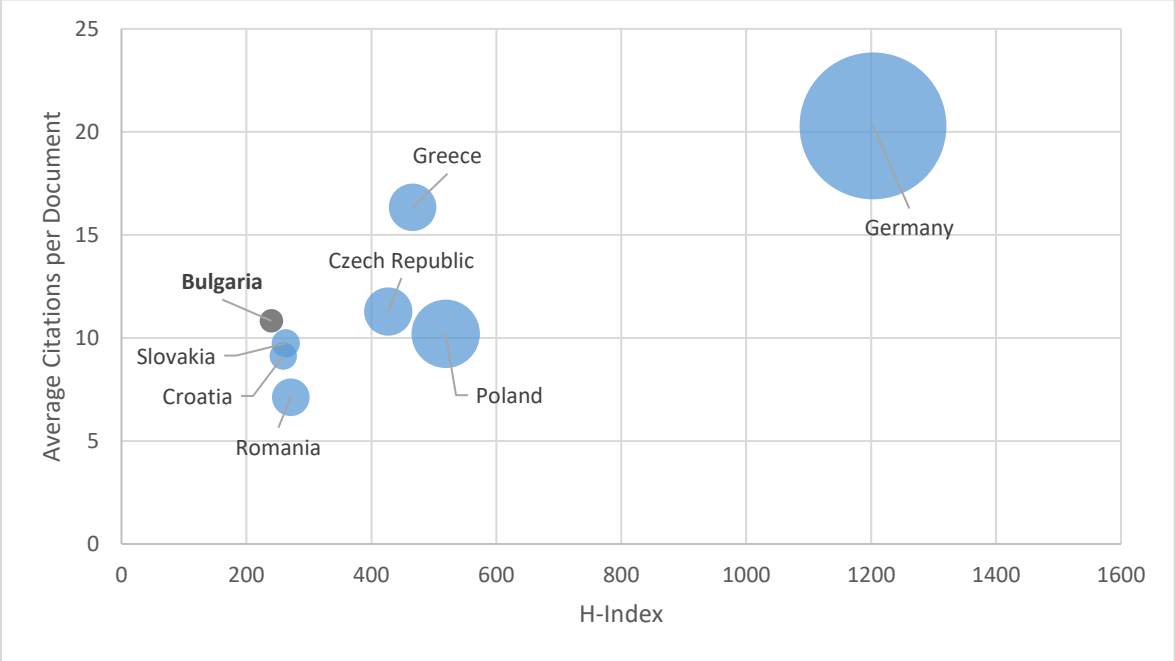
Source: Eurostat

Soute et al. (2015) also note that low salaries can result behaviour with adverse effects on research. Currently, research grants from the NSF are legally permitted to be used to supplement the salaries of those working on the research. This practice can have unintended consequences and is open to misuse, in which research funding is sought primarily to augment salary rather than to carry out the grant's intended research objectives.

Research and Innovation Outputs

Bulgaria lags behind most of its peers in both quantity and quality of research outputs. Bulgaria's publication output has been increasing since 2015, growing at a rate of almost 9 percent per year from 2015 to 2019, but Bulgaria's publications tend to be less cited and less impactful that those of its peers. Bulgaria ranked last among its peers in scientific publications among the top 10 percent of most cited publications worldwide as a percentage of total publications in the country in 2019, and Bulgaria and Romania had the lowest share of publications that were cited from 2013-2018, with 46 percent of all publications going uncited during that timeframe. Figure 7 shows Bulgaria's publication outputs ranked by two additional metrics for publication quality: average citations per publication and h-index[1], a measure of both the productivity and citation impact of a group of publications. Bulgaria ranked among the middle of its peers in the average number of citations per publication from 1996-2018, ranking above Romania, Croatia, Slovakia, and Poland. However, Bulgaria ranked last among peers in h-index, which indicates that the Bulgarian research system was both less productive and less impactful than its peers – at least in terms of academic publication outputs – from 1996-2018.

Figure 7: Ratio of H-Index to average citations per publication, 1996-2018

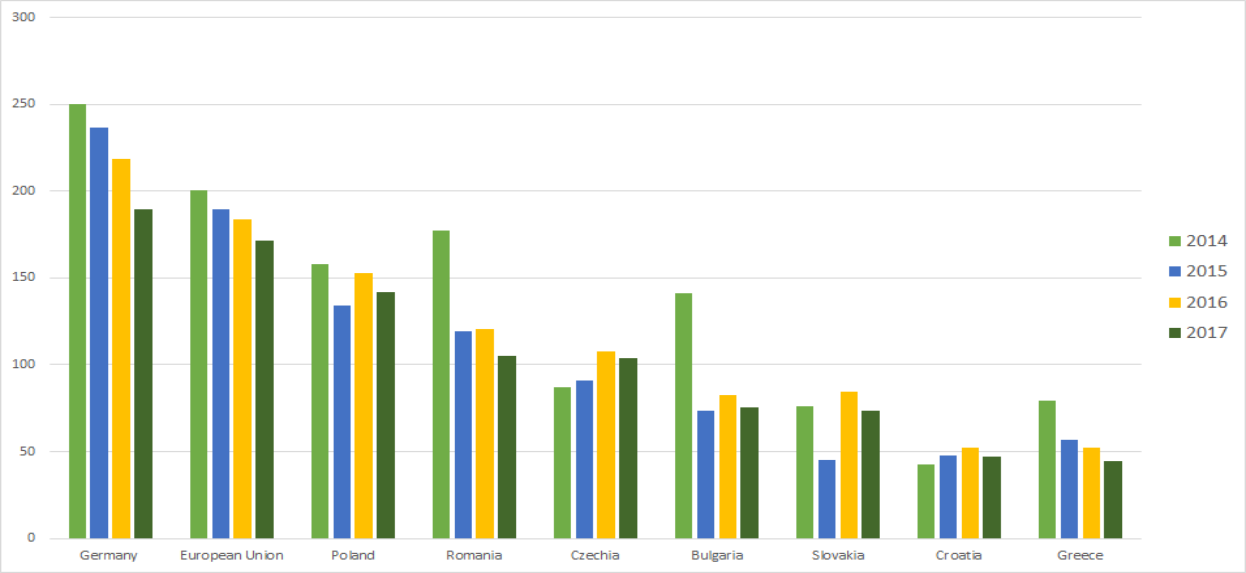


Source: Scimago | Note: The size of the bubble represents that total number of publications.

[1] The h-index is a metric that measures both the productivity and citation impact of a body of publications. Typically used to measure the impact of a given author, but also used to measure the impact of scholarly journals, institutions, or countries, the index is based on the most cited papers in set and the number of citations that they have received in other publications. The H-index is an aggregate measure that combines data on citation and paper count and is preferred over comparing paper counts alone. The H-index can vary across fields due to their particular publishing and citing frequencies. For more information, see Hirsch 2005.

In terms of patent outputs, Bulgaria ranked ahead of only Slovakia, Croatia, and Greece in the number of patent applications to the European Patent Office (EPO) per GERD among its peers in 2017, which shows that the Bulgaria STI system is relatively unproductive in producing valuable IP. Worryingly, patent productivity has declined since 2014, as shown in Figure 8.

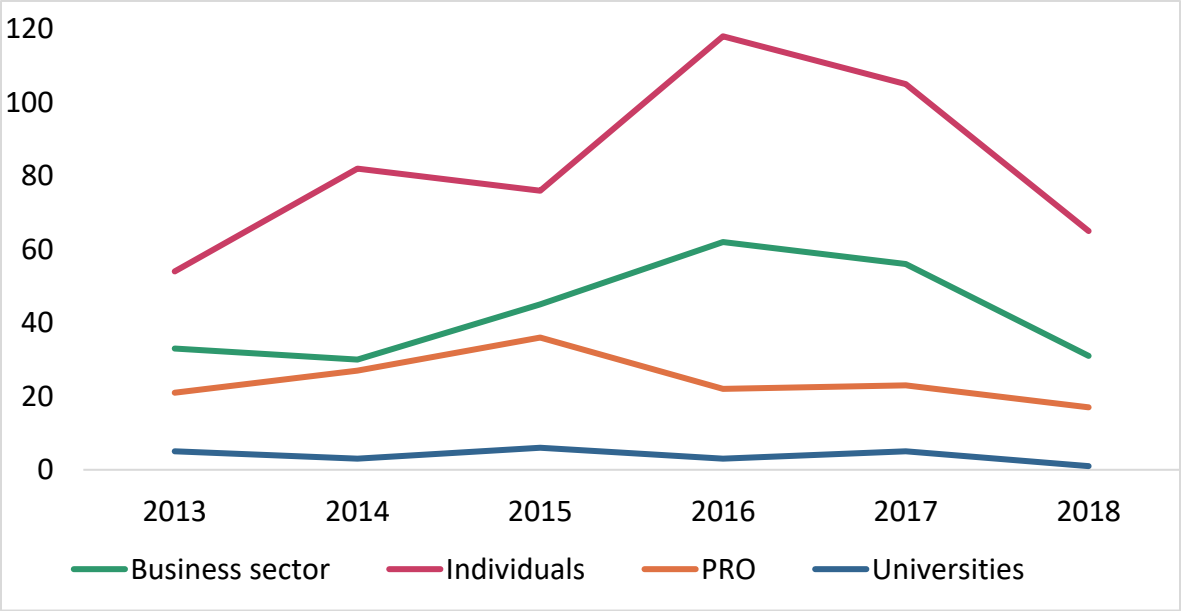
Figure 8: Patent applications to the EPO per billion Euro of GERD (2014-2017)



Source: Eurostat

The Bulgarian public sector plays only a small role in generating patents, as can be seen in Figure 9, where the private sector is the leading source of patents in Bulgaria (after individuals), followed by PROs and universities. This patenting pattern could be indicative of issues in the national IP regulatory and incentive framework and could also be driven by the lack of budgets for IPR activities in public research institutions, leading public researchers to file as individuals.

Figure 9: Patent activity by type of inventor, 2013-2018

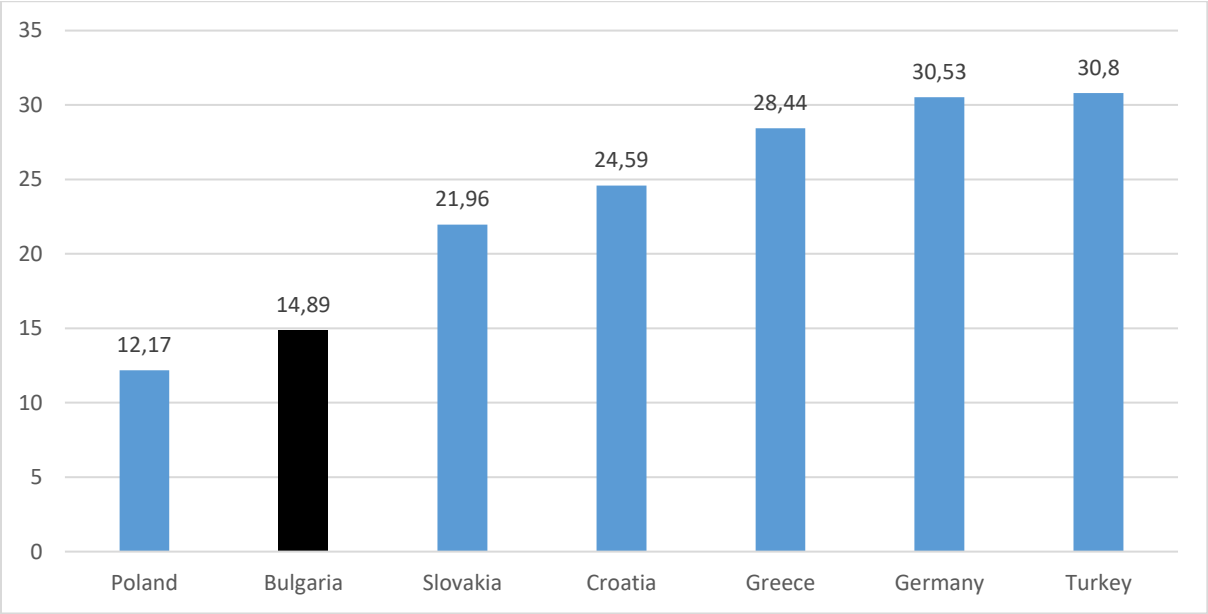


Source: Patent Office of Republic of Bulgaria (PORB)

Research and Innovation Outcomes

In terms of innovation outcomes, Bulgaria performs relatively well compared to peers in startup creation. The country leads all peers in new business density and in startups and scaleups per capita. However, few new businesses offer new or innovative products and services compared to startups in peer countries, shown in Figure 10. Further, the sectoral distribution of Bulgarian startups activity does not match much of Europe's, with over half of new ventures started in retail or wholesale, which are extremely vulnerable to economic downturns. Bulgaria has a smaller share of early-stage startups belonging to knowledge-intensive industry sectors than innovation-driven economies; rather, the industry sector distribution of Bulgarian startups is similar to the distribution in factor- and efficiency-driven economies (GEM, 2018).

Figure 10: Share of entrepreneurs believed that their product was new to all or some customers, 2018

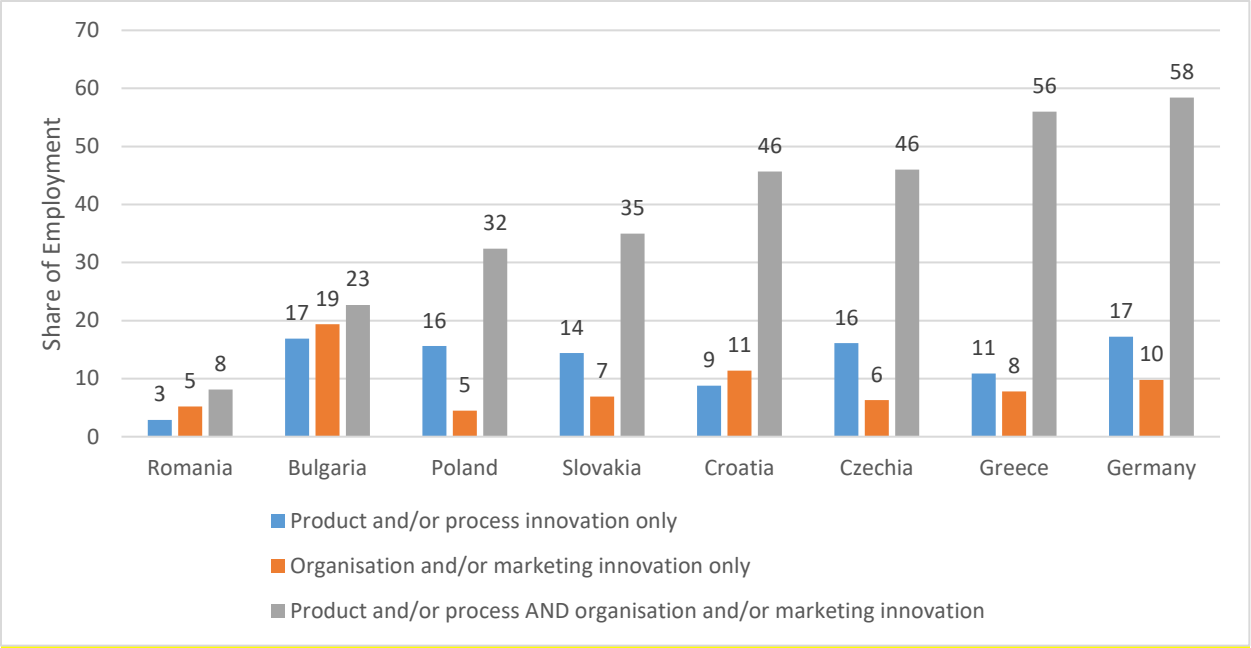


Source: Global Entrepreneurship Monitor (2018)

Commercialization outputs (licenses and startups) from Bulgaria's public research institutions (PROs and HEIs) appear to be very low, though it is hard to say definitively due to lack of data.

Bulgaria lagged behind all peers except for Poland and Romania in the share of firms that introduced an innovation (product, process, marketing, or organizational innovation) in 2016, as can be seen in Figure 11. However, innovation in Bulgarian firms as measured by employment has grown in both product/process and marketing/organizational innovations, and the share of non-innovators has dropped from 51% to 41% over that period.

Figure 11: Share of firms that introduced a product, process, marketing, or organizational innovation in 2016



Source: Eurostat

An additional worry is the low level of digitization of Bulgarian firms, and the low levels of both basic and advanced digital skills among the population. Bulgaria lagged behind all other EU countries in multiple indicators related to business digitization in the 2019 DESI index, while, along with Romania, the country ranks last among peers in basic and advanced digital skills.

Rationale

It is critical for Bulgaria to improve its research and innovation performance and revise its approach to the STI policies in the next programing period. The country cannot afford further suboptimal allocation of funds and resources, especially with the expected significant increase in available resources made to the country in support of R&I. Increasing spending requires careful assessment of the functioning, efficiency and effectiveness before expanding even further. Individual impact evaluations of specific programs or instruments will not be sufficient. A comprehensive and thorough review of the policy mix, the effectiveness and efficiency of public resources is needed to achieve the desired STI outcomes. This represents an opportunity for learning from national, European, and international experiences in order to clearly define the goals, roles and responsibilities of the participating actors.

Project activities and output

Scope of Activities

This advisory project consists of a Public Expenditure Review (PER) in Science, Technology and Innovation (STI). It is an exercise that will allow for the process of "re-thinking" the STI policy mix to improve effectiveness of public investments. The PER will allow this process to be implemented in a rigorous and comprehensive manner and will provide a set of specific recommendations building on good practices to better design and implement STI investments and policies. Specifically, it seeks to improve the impact of public support to STI on productivity and growth by focusing on: i) effective design and implementation of programs, instruments, policies and institutions; ii) effective monitoring and allocation of resources that focus on managing for results. This work comes at the request of Ministry of Education and Science (MoES) and will be implemented in close collaboration with the Ministry of Economy, as well as other relevant stakeholders such as the Managing Authorities of the EC Operational Programs.

In delivering the advisory services under this project, the Bank team will take into consideration any relevant analytical documents provided they are made available during the implementation of this Agreement, in particular:

(a) A strategic evaluation of the Centers of Excellence (CoE) and the Centers of Competence (CoC) as related to the recommendations provided by the Joint Research Center of the European Commission (JRC);
(b) Reports provided by the Interreg Europe Policy Learning Platform to the management teams of the CoE and CoC;
(c) The Mid-term Evaluation of OP SESG;
(d) An Ex-ante assessment and the investment strategy for implementing financial instruments under Operational Program "Science and Education" (OPSE) for the 2021-2027 programming period, to be contracted by the Ministry of Finance.

Component 1: Analysis of the Quality and Coherence of the Policy Mix

The Country Ecosystem Diagnosis and Policy Mix analysis provides a comprehensive overview of the country's demand for innovation, its institutional and governance readiness, the budget structure and policy mix and how well they respond to the country's needs. Specifically, this component will include the following activities:

Table 1. Component 1 activities and deliverables

Activity 1.1	**Country Context and ecosystem diagnosis**. Basic analysis of the different pillars of the STI ecosystem focused on identifying the demand for innovation and framework conditions. This analysis provides background information and contextualizes the analysis of the quality and coherence of the policy mix. It is a review of the complete STI system, its institutions, policies and programs, including benchmarking Bulgaria to (regional and structural) peers. The assessment encompasses a review of the current state of the country's R&D personnel, issues related to attracting and retaining young scientists, and the status of international research collaborations. The diagnosis included a module focused on private sector innovation activities and productivity dynamics at the

Deliverable	firm level analysis using existing national primary data. It also includes a module analyzing the national research collaboration and tech transfer framework, consisting of two WB survey efforts to collect data on public researchers' and PROs' perspectives (an online survey of public sector researchers and an in-person survey of public research institutions and technology transfer offices). Analysis of the Bulgarian STI ecosystem (this includes the background papers on the findings from the PROs and researchers survey and the firm-level productivity analysis)
Activity 1.2 **Deliverable**	**Mapping policy mix.** The purpose of this activity is to map all the STI support instruments in the form of a data table (portfolio matrix) including all public instruments targeting education, research (basic, applied), innovation, enterprises, and entrepreneurs. It is important to note that although the main counterpart for this RAS is the MoES, the scope of the policy mapping exercise covers all STI instruments including ones administered by other line ministries and agencies (most notably Ministry of Economy and its OP). The portfolio mapping exercise includes more than a 100 support instruments covering a period of seven years. The portfolio mapping was supported by two data streams: (i) data collected through desk review of program documentation, calls for proposals, and other available sources; and (ii) data on actual results of calls and programs. The analysis differentiates between EU and nationally funded programs as well as national versus regional programs. This required frequent interaction between the World Bank team and the different counterparts to provide proper explanation of the data needed, and to help populate and verify the portfolio matrix. Information sessions and meetings were organized between the WB team and designated Points of Contacts (PoC) to ensure proper collection of the necessary information. The data collection process resulted in a comprehensive database and will be delivered to the counterpart alongside the analytical report. Database, containing all STI support instruments (excel sheet file)
Activity 1.3 **Deliverable**	**Policy mix analysis (quality and coherence analysis).** This analysis concludes Component 1 and includes two key sub-activities: Consistency assessment of the policy mix. Based on the portfolio mapping, the WB team will assess the consistency between the different instrument/variables considered. The purpose is to examine any possibilities for consolidation, termination or introduction of support mechanisms. The assessment primarily focuses on: i) the allocation of resources; ii) Identification of overlaps between the elements of different programs and the extent of overlaps; iii) Coherence of the key features included in a particular program and the level of correspondence between them; iv) Checking for the size of the programs and their relevance, including the likelihood for impact; v) Concentration of instruments employed, level of diversification and their appropriateness; vi) Existence of co-funding mechanisms and the degree of their applicability; vii) Financial sustainability and predictability of the programs. Policy coherence. Focused on the connections and alignment between the results of the STI context and the consistency assessment. It mainly examines the coherence between the country context, the demand for innovation, and the existing offering through the existing portfolio. Ecosystem Assessment and Policy Mix analytical report

Outputs from Component 1:

Outputs from component 1 include: i) Comprehensive portfolio mapping database, ii) Ecosystem Assessment and Policy Mix analytical report. The Ecosystem Assessment and Policy mix analysis report will provide insights into the quality and coherence of the policy mix, including by identifying redundancies and gaps.

Component 2 – Functional and Governance Analysis

The functional and governance analysis is an in-depth assessment of the design, implementation and governance of specific instruments, by institution and position within the policy mix. It complements Component 1 by looking thoroughly at the gaps and complementarities of the instruments across and within the institutions. The functional and governance analysis will be conducted on a narrower set of instruments and programs than the portfolio mapping, in consultation with the counterpart. The selection of instruments for the functional analysis will be carried out in consultation with the Ministry of Education and Science (and Ministry of Economy) and based on (1) the relative size of the support provided for science and innovation that they represent (mix of big and small instruments), (2) the type of instruments (mix of national and European - OP), (3) the representativeness of a specific class of instruments (representation of portfolio of instruments), and (4) relevance and importance for future programming period.

The objective is to assess the quality of the design, implementation and governance – coordination among instruments, among institutions and the typology of programs occupying different positions within the policy mix.

The functional and governance analysis component consists of three main activities:

Table 2. Component 2 activities and deliverables

Activity 2.1 **Deliverables:**	**Interview guidelines and data collection** Based on a previously prepared guide, semi-structured interviews will be conducted with program managers. Each interview is expected to take about 2 hours per instrument and will focus on its design, implementation and inter-institutional integration (governance). Specifically, the interview guide allows for collection of detailed information for areas related to design; areas related to implementation, areas related to governance. During the interview or as a follow up, the interviewer may ask for program documentation. Due to the COVID19 outbreak and travel restrictions, many of these interviews will have to be conducted virtually (through webex). Data on design, implementation, and governance of the STI instruments
Activity 2.2	**Functional and governance analysis.** For each interview, a scoring matrix from 1 to 5 will be populated by the interviewers, indicating the level of approximation to best practices. Comparison among different units, programs, and institutions will be conducted to identify any gaps in performance. This includes specific benchmarking between instruments as well as crosshatching them with international practices. For example, one of the areas that would be considered is the application process during the implementation of a particular instrument. This would entail assessing the application procedure and process

	of the instrument, its accessibility, and the evaluation mechanism, etc. The analysis will employ statistical methods (clustering) to identify patterns in the data at a granular level, uncovering relationships and redundancies among variables and instruments. The analysis will be provided in summary form, as well as for each of the instrument. It is important to note that the functional analysis will be able to include instruments/programs that are expected to be designed and introduced during the exercise period. To this extent, the focus will be on the "design" dimension of the instrument/program. The expected outcome from this exercise is a set of recommendations that should aid the process of developing a strategic vision for STI public support, rationalization of the STI policy mix by identifying redundancies and gaps, strengthening the design of future/envisioned instruments and the implementation of existing ones based on international best practice, and improving the governance and articulation of STI policies.
Deliverable	Functional and Governance review analytical report
Activity 2.3	**Capacity building:** Parallel to the two activities described above, the WB team will deliver a capacity building program focused on the design, implementation, and evaluation of innovation policy instruments. One key outcome of the PER STI exercise is to improve and rationalize the country's policy mix and provide policymakers with the evidence-base to define new or improved policies and policy objectives. The capacity building activities aim at sharing international best practices, equipping policy makers and practitioners with design, implementation, and monitoring tools, and building learning networks within the country and across the borders. Defining Monitoring and Evaluation Framework for STI policy instruments: An integral part of the capacity building program will be related to the development of monitoring and evaluation framework for policy instruments. This program will include (i) delivery of a series of training workshops by international experts and practitioners – for officials of the administration of the Council of Ministers (CMA), the Ministry of Finance (MF), the MES, the EA OPSESG, the Ministry of Economy (ME), and in general for officials of the administration of the executive authorities with functions regarding the implementation of research and innovation policy; and (ii) study tour to learn from the experiences of global leaders in relevant areas. The M&E activity aims at assisting program managers in defining the logical framework for assessing progress and evaluating the results of select programs. Due to the COVID19 outbreak and travel and meeting restrictions, several of these workshops and the study tour might have to be conducted virtually (through webex). Decisions on the format of the delivery will be taken in consultation with the counterpart in light of the conditions at the time.

Deliverable	Capacity building program focused on the design, implementation, and evaluation of innovation policy instruments

Outputs from Component 2:

Outputs from Component 2 include: i) Guidelines for semi-structured interviews for functional and governance analysis; ii) Functional and Governance review analytical report, which includes a separate Roadmap for Implementation of the policy recommendations report. iii) Capacity building program (Study tour, M&E training workshop, Workshop to deliver findings from Components 1&2).

The Functional and Governance review analytical report (output ii) will include a set of recommendations that should aid the process of developing a strategic vision for STI public support, rationalization of the STI policy mix by identifying redundancies and gaps, strengthening the design of future/envisioned instruments, and the implementation of existing ones based on international best practice, and improving the governance and articulation of STI policies

Phase 2

Component 3 – Efficiency Analysis

The component focuses on evaluating the efficiency of a sample of existing instruments, meaning their ability to produce the expected outputs given the inputs and resources used. As an example, it will calculate, per program, the amount of transferred to beneficiaries for every US$1 spent on the administration of the program. The objective of this component is to identify potential efficiency gains and priorities that require more efficiency.

The team will apply an Efficiency Analysis on a select sample of instruments identified according to size and other priority criteria (i.e. potential impact, government's interest in scaling up, etc.). The selection of programs for this analysis will be carried out in consultation with the Ministry of Education and Science (and Ministry of Economy) based on (i) the portion of the support provided for science and innovation that they represent, (2) the number of recipients, and (3) availability of information and data on inputs, outputs and outcomes. The evaluation of the selected programs is expected to improve the efficiency and quality of the services offered by providing a methodology where the responsible authorities can evaluate and benchmark the efficiency and service delivery of their programs and maximize the resources that are used for innovation policy.

Table 3. Component 3 activities and deliverables

Activity 3.1	**Methodology and data collection instruments**: A complete assessment of costs including fixed and administrative costs will rely on detailed data gathering fieldwork. This will include costs of the program but also costs of beneficiaries for instance for applying to the program. Costs of the program will be broken down into (1) direct and indirect financing, (2) personnel (managers and supervisors.), (3) design, materials and infrastructures, (4) calls for application, marketing, application and selection, (5) implementation, follow up.
Deliverables:	Methodology and data collection instruments

Activity 3.2	**Efficiency analysis**: A comprehensive assessment of all products and outputs for beneficiaries, both tangibles and intangibles, and also (if possible) include an assessment of products and results for non-beneficiaries which can be considered externalities that can be attributed to the program.
Deliverable	Assessment of beneficiary outputs
Activity 3.3	**Beneficiary Survey:** The data for the analysis will partially come from information already collected by the implementing authorities/agencies (for example costs, characteristics of beneficiaries, services provided or outputs, and results). In addition, the WB team will conduct a beneficiary survey for each of the selected program[2]. The survey provides information on key characteristics of beneficiaries (researchers, enterprises, entrepreneurs), their perception regarding the design, implementation, key inputs, outputs, and outcome attributed to the program costs and quality of services.
Deliverable	Data on beneficiaries and their characteristics
Activity 3.4	**Input-Output analysis:** Complete accounting of inputs and products, both tangible and intangible, at both the program/beneficiary level. The analysis will include two parts. The first part will quantify the relationship between inputs and outputs, including an assessment of the quality of services provided. The second part will report progress on outcomes of interest, acknowledging that it is not feasible from a technical point of view to determine if the observed changes in the outcomes of interest were caused by the program (i.e. causality attribution). Examples of outcomes of interest discussed with some implementing authorities include, among others: quality of publications/research, citations, continuity of collaborations, prototypes developed, intellectual property (software, patents, licensing), technologies transferred, and degree of commercialization. Additionally, wherever possible, benchmarking with similar programs implemented at international level for which data on efficiency are available.
Deliverable	Efficiency analysis report

Outputs from Component 3:

Outputs from Component 3 include: i) methodology and data collection instruments; ii) Efficiency analysis report including the cost structures of the selected instruments, product assessment, the findings from the beneficiary survey, and input-output analysis. The results of the efficiency analysis will be presented at a workshop.

[2] The survey will be designed by the World Bank team

Implementation plan, risk and deliverables

Process overview

The implementation plan (work plan) has been prepared in accordance with the effectiveness date of the Advisory Services Agreement, June 10, 2020. The table below (Implementation plan) presents a summary of a detailed activity schedule including reporting plan, timetable of the main activities, and deliverables following the timetable of the Advisory Services Agreement.

For a timely and successful delivery of the outputs planned under Component 1 (Analysis of the Quality and Coherence of the Policy Mix), Component 2 (Functional and Governance Analysis), and Component 3 (Efficiency Analysis) it is important that the MOES provides in a timely manner all the information required for the development of the activities as per the Advisory Services Agreement:

i. For the carrying out of activities under Component 1: Information regarding the number and characteristics of the policy instruments in place; Verify the gathered information from the team[3];

ii. For the carrying out of activities under Component 2: Information regarding the design, implementation, and governance of the selected instruments (programs and instruments' operations manuals, annual reports, etc.); and

iii. For the carrying out of activities under Component 3: Information regarding the fixed and administrative costs and the beneficiaries for the selected instruments.

A number of workshops will be conducted during the course of this Advisory work. Their schedule will be decided upon joint consultation with the MOES. Due to the COVID19 outbreak and travel and meeting restrictions, decisions on the format of the delivery will be taken in consultation with the counterpart in light of the conditions at the time.

Implementation plan

1. Pre-launch and Inception Phase (June 2020)

During the period leading up to the project launch or 'Inception Phase' (period preceding the agreement ratification in June 2020), the project structures were established, including mobilization of the team members, meetings with key stakeholders, familiarization with strategic documents, instruments, and data, collection of new data, development of project management structures and the project work plan (including timetable).

Despite the delay in the ratification of the project, the project team was able to undertake much of the work in Component 1: Analysis of the Quality and Coherence of the Policy Mix. This included Activity 1.1 (Country Context and ecosystem), Activity 1.2 (Policy Mix Analysis), Activity 1.3 (Analysis of the quality and coherence of the policy mix). The team designed and implemented a researcher and research institutions survey, collected data on more than a 100 STI policy instruments, and analyzed and benchmarked data from different national and European sources.

[3] These data have been already provided by the Ministry team.

Due to the travel and meeting restrictions imposed by the COVID19 outbreak, the team delivered two virtual workshops (on June 10 and June 16, 2020) to the counterpart and key ecosystem stakeholders to disseminate preliminary findings and policy recommendations from the country needs assessment and the researchers' survey (see Annexes 2 and 3). Finally, the team provided several rounds of comments and inputs on the draft proposals for the Operational Programmes currently under preparation by the counterpart team based on the emerging findings from the analytical work and will continue undertaking the same approach in the future.

Deliverables in the Inception Phase - (i) Inception Report

2. Implementation Phase (July 2020 – March 2022)

Component 1: Analysis of the Quality and Coherence of the Policy Mix including deliverables:

i) Comprehensive portfolio mapping database, ii) Ecosystem Assessment and Policy Mix analytical report. The Ecosystem Assessment and Policy mix analysis report will provide insights into the quality and coherence of the policy mix, including by identifying redundancies and gaps. The Ecosystem Assessment and Policy Mix analytical report will be submitted with two background papers: an analysis of firm-level productivity dynamics and a study of research collaboration and tech transfer of Bulgarian public research institutions.

Component 2: Functional and Governance Analysis

i) Guidelines for semi-structured interviews for functional and governance analysis; ii) Functional and Governance review analytical report, which includes a separate Roadmap for Implementation of the policy recommendations report. iii) Capacity building program: a. Study tour, b. M&E training workshop, c. Workshop to deliver findings from Components 1&2, d. Workshop to discuss the Roadmap for implementation of policy recommendations. The analytical report (output ii) will provide a detailed assessment of the gaps, weaknesses and bottlenecks in the process of design, implementation, and governance of public support for innovation.

Component 3: Efficiency analysis

i) methodology and data collection instruments; ii) Efficiency analysis report including the cost structures of the selected instruments, product assessment, the findings from the beneficiary survey, and input-output analysis. The results of the efficiency analysis will be presented at a workshop.

Timeline of the deliverables:

*Table 4. Timeline for Deliverables (per legal agreement and expedited plan)**

Deliverable	**Deliverable date as per the legal agreement**	**Tentative Deliverable Plan (expedited)[4]**
1.0 Inception report	Two (2) weeks after the effectiveness date of the Agreement	June 2020

[4] The expedited dates take into consideration the counterparts pressing deadlines of preparing the Operational Programmes for the coming period and the delay in the ratification of the agreement and consequently the effectiveness date. The team will make all effort needed to submit inputs, preliminary findings, and drafts ahead of schedule if needed or requested by the counterpart.

1.1 Portfolio mapping	Within three (3) months from the Effectiveness Date of the Agreement	August 2020
1.2 Ecosystem Assessment and Policy mix analysis	Within six (6) months from the Effectiveness Date of the Agreement	August/September 2020
2.1 Proposed Guide for semi-structured interviews	Within six (6) months from the Effectiveness Date of the Agreement	August/September 2020
2.2 Governance and functional analysis	Within fourteen (14) months from the Effectiveness Date of the Agreement	December/Jan 2020
2.3 Capacity building activities – from officials of the administration of the CMA, the MF, the MES, the EA OPSESG MI, and in general for officials of the administration of the executive authorities with functions regarding the implementation of innovation policy	Within thirteen (13) months from the Effectiveness Date of the Agreement	June 2020 (dates and format are to be agreed upon on with the counterpart)
3.1 Proposed Methodology and data collection instruments	Within fourteen (14) months from the Effectiveness Date of the Agreement	February 2021
3.2 Efficiency analysis	Within eighteen (18) months from the Effectiveness Date of the Agreement	August/September 2021
3.3 Dissemination workshop	Within nineteen (19) months from the Effectiveness Date of the Agreement	October 2021
Final Report for PER STI (Pillar 1 activities of the legal agreement)	Within twenty (20) months from the Effectiveness Date of the Agreement	November/December 2021

*a more detailed Gantt chart is included in the Annex

Summary of Risk and Mitigation

The table below summarizes the key risks and the mitigating measures that are relevant for this task. It follows the World Bank format for project specific risk assessments and reflects the internal risk assessment done by the Bank in preparation for the Advisory Program. The general risk for the program is rated low.

Table 5. Project Risks and Mitigation Measures

Risk	Description	Impact	Likelihood	Mitigation
R1: Political Commitment and participation of key Bulgarian ministries and institutions	While MoES is the main client for the project in question, there are many more institutional stakeholders (including the Ministry of Economy and other implementing agencies) who contribute to STI objectives in Bulgaria. These stakeholders need to validate and verify the relevant data collected by the WB team on the portfolio mapping. There can be coordination failure between these institutions and thus a lack of overall buy-in from stakeholders as a result.	**High**	**Low**	To mitigate this risk, the team will include and consult, at the design and implementation stages, the counterparts from key ministries and institutions to communicate the benefits and value added of the exercise. Additionally, the team will identify points of contacts within each of the institutions and clearly communicate the components, tasks, and timelines. These points of contacts will be the main technical counterpart for data access and validation.
R2: Data availability and accessibility	An integral part of the exercise is to access existing data and generate new data working with agencies, ministries, and beneficiaries. Three main types of data are needed: For component 1 - Access to existing datasets of national firm level census or survey (statistics office). For components 2 and 3 - Detailed instrument data for all the instruments that directly or indirectly support beneficiaries to achieve STI outcomes including information on budget, objectives, beneficiaries, mechanism of intervention, etc. Detailed data on administrative costs, type and value of projects funded and qualitative information on service quality via survey of	High	Low	To mitigate this risk, the team will conduct analytical work using publicly available data. For all other data needs, the team will work closely with focal points nominated by the relevant institutions to facilitate data collection and coordination. In other instances, the WB team will conduct data collection through it's own channels with the support and facilitation of the counterpart.

	beneficiaries. Lack of complete, accurate and timely data may jeopardize the timeliness and quality of project outputs.			
COVID 19 global pandemic	The ongoing COVID 19 global pandemic can impact and disrupt the project in a number of ways, including restricting the movement of project staff; preventing planned project physical activities, such as in-person interviews, workshops, and study visits; and disrupting Bulgarian government operations and communication	High	High	To mitigate these risks, the project team relies on VTC technologies for communication and coordination, and can use these methods to contact and interact with government counterparts and other stakeholders. Planned in-person activities can be substituted for virtual workshops, interviews, and webinars.

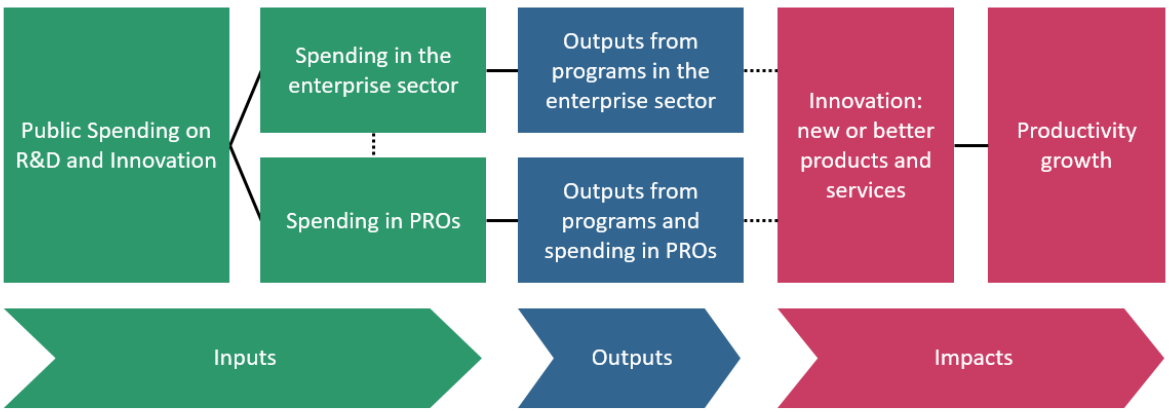
Public Expenditure Review in Science, Technology and Innovation Approach

This advisory project consists of a Public Expenditure Review (PER) in Science, Technology and Innovation (STI). It is an exercise that will allow for the process of "re-thinking" the STI policy mix to improve effectiveness of public investments. The PER will allow this process to be implemented in a rigorous and comprehensive manner and will provide a set of specific recommendations building on good practices to better design and implement STI investments and policies. Specifically, it seeks to improve the impact of public support to STI on productivity and growth by focusing on: i) effective design and implementation of programs, instruments, policies and institutions; ii) effective monitoring and allocation of resources that focus on managing for results. This work comes at the request of Ministry of Education and Science (MoES) and will be implemented in close collaboration with the Ministry of Economy, as well as other relevant stakeholders such as the Managing Authorities of the EC Operational Programs.

The PER STI methodology is a results-based framework to logically link inputs, outputs, outcomes, and impacts. It proposes that "increasing productivity" (including labor productivity and total factor productivity or TFP) is the ultimate developmental goal to be achieved. Three corresponding default intermediate outcomes are identified based on the evidence provided by the academic literature: (i) research excellence; (ii) collaboration of science and industry, including research commercialization; and (iii) business innovation, including STI and technology adoption and diffusion.

The approach is detailed in Figure 12, which depicts the structure of a generic logical framework for the assessment of research and innovation public policies, using an input-output-outcome-impact (IOOI) model. More information about the PER STI framework can be found in Correa, 2014.

Figure 12: PER STI Framework



The Bulgaria PER STI project, building on recent World Bank PER STI projects in Croatia, Czech Republic, Poland, and elsewhere, has three core components. Each component has a number of individual sub-tasks (elaborated in the Detailed Activity Description section).

- Analysis of the quality and coherence of the policy mix: a comprehensive overview of the flow of funds in the system, the budget structure and policy mix and how well they respond to the country's needs. It consists of portfolio mapping of all the STI support programs, as well as analysis of the collected information. This component provides a comprehensive overview of

the country's demand for innovation, its institutional and governance readiness, the budget structure and policy mix and how well they respond to the country's needs.

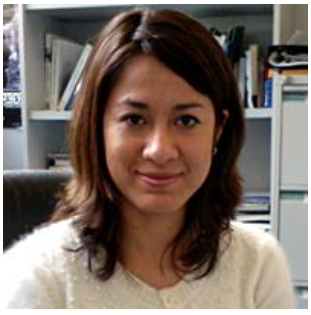
- Functional and governance analysis: an in-depth assessment of the design, implementation and governance among instruments, institutions and position within the policy mix. It consists of extensive field work and data collection through semi-structured interviews with program managers, as well as analysis of the collected information. This component includes a capacity building task which aims at sharing international best practices and equipping policy makers and practitioners with design, implementation, and monitoring tools. This component complements Component 1 by looking thoroughly at the gaps and complementarities of the instruments across and within the institutions.
- Efficiency analysis: an analysis of outputs and outcomes for selected programs which includes looking at the relationship between inputs and outputs and monitoring the progress of the outcomes of interest.

The outputs from these components and activities are intended to inform the counterpart during the preparation of the new programming period, as well as the implementation plan of the existing Research Strategy.

Annex 1: Project team

The World Bank has assembled a team of experts with extensive experience in science, technology, and research policy and programming in Europe and around the world.

	**Anwar Aridi** Senior Private Sector Specialist, Task Team Leader Anwar Aridi is a Senior Private Sector Specialist at the Europe and Central Asia (ECA) unit of the Finance, Competitiveness, and Innovation Global Practice at the World Bank in Washington DC. Anwar specializes in science, technology, and innovation policy issues, private sector development, technology entrepreneurship, and technology transfer. He previously worked as an Economic and Technology Policy Analyst at SRI International Center for Science, Technology, and Economic Development and at the World Bank Middle East and North Africa Country Management Unit. Anwar holds a Ph.D. from the Trachtenberg School of Public Policy and Administration at the George Washington University (GWU) in Science and Technology Policy.
	**Daniel Querejazu** Innovation Policy Consultant Daniel Querejazu joined the World Bank in 2019 and has on a range of projects related to research policy and funding schemes, entrepreneurship support, digital entrepreneurship, firm digitization, and other innovation-related matters. Prior to joining the World Bank, Daniel worked for the Center for Innovation Strategy & Policy at SRI International, where he supported public and private organizations achieve long-term economic and social impact through effective investments in science, technology, and innovation. Daniel hold an M.A. in Global Policy from the University of Texas.
	**Umut Kilinc** Economist Umut Kilinc is an economist at the World Bank. He holds an M.Phil. degree from Tinbergen Institute, Erasmus University Rotterdam and a Ph.D. from Tinbergen Institute, VU University Amsterdam. After completing PhD studies, he conducted a post-doc project on firm-level productivity, efficiency in resource allocation, exporting and markups in Luxembourg funded by Marie Skłodowska-Curie Actions. He worked as a research economist at STATEC Luxembourg. He served as a research and teaching assistant in Vrije Universität Amsterdam, thought courses in applied economics at the University of Luxembourg and has acted as a referee for various academic journals in economics. He conducted research on the economies of Bulgaria, Russia, Japan, Luxembourg, Turkey and Ukraine. His area of research covers broad topics in industrial economics, productivity,

	growth, microeconomic restructuring and international trade.
	**Prof. Teodora Georgieva** Innovation Policy Consultant Professor in the field of Strategic management of science, technology and innovation at the International Business School, Bulgaria. Teodora Georgieva is a senior fellow at the Applied Research and Communication Fund in Sofia, Bulgaria. As part of the ARC Fund's team, she has experience in developing and implementing strategic and programme documents at national, regional and business levels in the field of innovation and technology transfer. Relevant experience includes Innovation Strategy for Smart Specialization of Bulgaria, National Innovation Fund, National Science Scoreboard of Bulgaria; Innovation Promotion Law; Megaprojects in the field of Research Infrastructure; ERAWATCH Baseload Inventory; Annual Innovation.BG reports; Regional Innovation Strategy for the South-West region of Bulgaria; Annual Reports on the Bulgarian National Innovation Policy. ARC Fund is the national coordinator of the Enterprise Europe Network-Bulgaria. In this respect, she is engaged as a consultant for SMEs. In line with her work in a number of projects, Teodora Georgieva acquired the qualification of Licensed IMP³rove Guide-Innovation Management Consultant under the IMP³rove European Platform and Listed Key Account Manager for the Horizon 2020 SME Instrument.
	**Pluvia Zuniga** Senior Consultant Pluvia Zuniga is an expert in the field of economics of innovation and intellectual property. Her research focuses on new uses of patents (strategic behavior and patent markets), industry-science links (in both high-income and middle-income countries), R&D strategies by firms, the impact of innovation on productivity and the importance of financial constraints on innovation investment. Doctor Zuniga has also worked on the development of methodologies for new metrics in Science and Technology (e.g. OECD Patent Statistics Manual, 2009; Science, Technology and Innovation in Latino America and the Caribbean, IDB 2010). She has been researcher at the Catholic University of Leuven (2005-2006) and affiliated professor at the University of Paris Dauphine where she taught Economics of Intellectual Property (2006-2007). She has worked at the Organization of Economic Co-operation and Development as economist at the Directorate of Science, Technology and Industry (2006-2009) and the Inter-American Development Bank (IADB), at the Department of Science and Technology (2009-2011). She obtained her university degree in Economics from Monterrey Institute of Technology in Mexico, and master and Ph. D. at the Paris

	School of Economics in France.
	**Paulo Correa** Senior Advisor Paulo Correa is a lead economist in the Financial and Private Sector Department of the Europe and Central Asia Region of the World Bank working in the areas of investment climate assessments; innovation and competition policies; and private participation in infrastructure. Before joining the Bank, Paulo was a Deputy State Secretary at the Ministry of Finance, Brazil (Jan. 1999- Dec. 2001) in the Ministry of Finance; a consultant for the government of Panama on competition policy, trade remedy and consumer protection; an economist at the Brazil National Development Bank (1994-96), and a researcher with Brazil's Foundation for International Trade Studies (1992-94). Paulo lectured on microeconomics; international trade, economic development, the economics of antitrust and regulation and history of economic thought for about 10 years between 1992-02. He holds a M.Sc. in Economics, University of Western Ontario (1996-97) and a M.Sc. in Industrial Economics, Federal University of Rio de Janeiro (1991-94).
	**Juan Rogers** Senior Consultant Prof. Rogers is an internationally recognized expert in design, implementation and evaluation of public policies that focus on science and technology in economic development, competitiveness and uses of science and technology to address special social or economic needs. His research addresses knowledge intensive policies, knowledge flows, science for policy, science, technology and innovation (STI) policy, public management of STI, modeling and evaluation of R&D process, public expenditure reviews, public policy functional analysis, public policy impact evaluation, knowledge management and organizational change in the private and public sectors, technology transfer and diffusion policies and creativity in science and engineering. He publishes regularly on these topics in academic journals such as Research Evaluation, Research Policy, Journal of Public Administration Research and Theory, Local Government Studies, and the Journal of Engineering Management. Dr. Rogers has developed new methodologies of policy analysis, especially for science, technology and innovation policy evaluation and public expenditure review analysis. He has served as a consultant on public management of STI policy and research evaluation in several countries (Argentina, Chile, Colombia, Dominican Republic, Perú, Poland, Uruguay, Saudi Arabia, United Arab Emirates, China, South Korea and United States). He has conducted policy advice and analysis projects and written reports and policy briefs on public expenditure

	review, technology extension, STI policy and evaluation, and management of research for national and regional governments in Argentina, Chile, China, Colombia, Mexico, Poland and Uruguay, and for the World Bank and the Inter-American Development Bank. Professor Rogers received his PhD in Science and Technology Studies from Virginia Tech and is an electrical engineer from the University of Buenos Aires, Argentina.
	**Lyubomira Dimitrova** Economic and Statistical Consultant Lyubomira is an economic and statistical expert who specialized private sector and industry related statistics. She is a chief expert at the Bulgaria National Statistical Institute working on calculation and maintenance of the Industrial Producer Price Indices. Lyubomira is finishing her PhD in Political Science at Sofia University and she has a Master of Social Science from Tartu University Estonia.
	**Vicky Chemutai** Trade Policy Consultant Vicky Chemutai is an Economist who currently specializes in the dynamics of international trade and its interactions with global issues which include, inter alia, climate and gender concerns. She has developmental experience spanning the: i) public sector in a couple of government agencies i.e. health, social security and the central bank; ii) private sector as a founder of several small-scale entrepreneurial ventures; and, iii) the international development sector focusing on trade policy formulation and implementation at the World Trade Organization (WTO) and the World Bank Group (WBG). Prior to joining the WBG, she was a Trade Policy Analyst in the Accessions Division of the WTO, as well as an adjunct lecturer at the International University in Geneva (IUG) in the fields of trade and statistics. She holds an MSc in International Trade Policy and Trade Law from Lund University (Sweden); an Advanced Post Graduate Diploma in International Trade Policy and Trade Law and several certificates in international trade and development from the Trade Policy Training Centre in Africa (TRAPCA) (Tanzania); and, a BSc in Quantitative Economics from Makerere University (Uganda).

Jan Kazimierz Orlowski
Labor Markets and Technology Consultant

Jan is an Economist at the World Bank FCI Markets & Technology team based in DC. His main areas of focus center on labor market economics, agriculture economics, state owned enterprises, and other quantitative research topics. Prior to joining the M&T team, Jan was part of Global FCI Industry Solutions at the World Bank, working on digital platform data, tourism, industry 4.0 and workforce skill development topics. Before the World Bank, Jan completed a PhD in Agriculture Economics at the University of Sydney, where he focused his research on optimizing crop insurance schemes considering the impact of global weather phenomena (ENSO) on staple crop yields. Over the course of his PhD, he worked as lead developer for an FX hedge advisory services firm and as a teaching assistant at the University of Sydney School of Economics. He also holds a Master in Natural Resource Economics from the University of Sydney, and a BSc in Economics & Management from Università Bocconi in Milan, Italy. Jan is from Poland and has a special interest in the growth and co-integration of central/eastern European countries.

Annex 2: Project outputs and activities timeline

	Component	Output	Activity	2020						2021											
				6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
	PHASE I																					
	Project Launch																					
1	Quality and Coherence of the Policy Mix	1.1 Portfolio mapping	1.1.1 Desk review of STI support programs																			
			1.1.2 Data collection from stakeholders																			
		1.2 Ecosystem Assessment and Policy Mix Analysis	1.2.1 Comparative review of the STI system (STI strategic context, governance, benchmarking)																			
			1.2.2 Consistency assessment of the policy mix (gaps, overlaps)																			
			1.2.3 Coherence assessment																			
	Project management	*Progress report 1*	*Drafting Progress report 1*																			
2	Functional and Governance Analysis	2.1 Guide for semi-structured interview	2.1.1 Preparation of guide for semi-structured interviews																			
		2.2 Governance and functional analysis	2.2.1 Selection of programs subject to functional review																			
			2.2.2 Interviews, field work and data collection																			
			2.2.3 Drafting functional and governance analysis report																			
			2.2.4 Drafting of Roadmap for the implementation of policy recommendations report																			
		2.3 Capacity Building	2.3.1 Study tour to learn from global leaders in innovation policy																			
			2.3.2 Training Workshop on Monitoring and Evaluation (M&E) for STI Policy Instruments																			
			2.3.3 Workshop to discuss findings of Component 1 & early findings from Component 2																			
			2.3.4 Workshop to present and discuss Roadmap for implementation of policy recommendations																			
	Project management	*Progress report 2*	*Drafting Progress report 2*																			
	PHASE II																					
3	Efficiency Analysis	3.1 Methodology and Data Collection instruments	3.1.1 Selection of programs subject for Efficiency Analysis																			
			3.1.2 Define cost structures																			
			3.1.3 Conduct product evaluation																			
		3.2 Efficiency Analysis	3.2.1 Data collection and processing for analysis of input-output (benefiary survey)																			
			3.2.2 Drafting report on Efficiency Analysis																			
		3.3 Workshop	3.4.1 Workshop to present and discuss findings and policy recommendations																			
	Project management	*Final report*	*Drafting Final report*																			
		-	*Project closing*																			

Annex 3: Country Needs Analysis Virtual Workshop, June 2020

This annex is collecting agenda and information presented and discussed during the workshop “Needs Analysis and Policy Mix” conducted on 10 June 2020 on WebEx.

List of documents published in Annex 2:

1. Agenda (English)

2. List of Participants

The presentation is attached to the Inception Report

Public Expenditure Review in Science, Technology, and Innovation and
Support for the Development of Education 2030 National Strategic Framework

BULGARIA RESEARCH & INNOVATION POLICY
Workshop
Wednesday, June 10, 2020
3:00 pm – 4:20pm | Virtual

Agenda

3:00 pm – 3:10 pm

Opening Remarks

Fabrizio Zarcone, Bulgaria Country Manager, World Bank
Karina Angelieva, Deputy Minister of Education and Science, Republic of Bulgaria

3:10 pm – 3:50 pm

Presentation

Bulgaria's Science, Technology and Innovation Performance: Preliminary Findings

Anwar Aridi, Senior Private Sector Specialist, World Bank
Umut Kilinc, Economist, World Bank

3:50 pm – 4:05 pm

Q&A
4:05 pm – 4:10 pm

Closing remarks

Ivan Popov, Managing Authority of Science and Education for Smart Growth Operational Programme

Participating Organizations

Organization:
Burgas Free University
Council of Ministers
Executive Agency Operational Programme Science and Education for Smart Growth (EA OPSESG)
Fund of Funds
Gatech
Institute of Biology and Immunology of Reproduction, Bulgarian Academy of Sciences
Institute of Information and Communication Technologies (IICT) at the Bulgarian Academy of Sciences
Institute of Philosophy and Sociology, BAS
Ministry of economy
Ministry of Education and Science
Ministry of Finance of the Republic of Bulgaria

National Statistical Institute
Sofia Tech Park JSC
Sofia Tech Park
University of Ruse "Angel Kanchev"
World Bank

Annex 4: Tech and Knowledge Transfer Activities in BG, Virtual Presentation, June 2020

This annex is collecting agenda and information presented and discussed during the workshop “Survey for Tech and Knowledge Transfer Activities in BG - Preliminary findings” conducted on 16 June 2020 on WebEx.

List of documents published in Annex 3:

1. Agenda (English)

2. List of Participants

The presentation is attached to the Inception Report

Public Expenditure Review in Science, Technology, and Innovation and
Support for the Development of Education 2030 National Strategic Framework

BULGARIA RESEARCH & INNOVATION POLICY
Presentation
Tuesday, June 16, 2020
3:30 pm – 5:00pm | Virtual

Agenda

3:00 pm – 3:10 pm
Opening Remarks

3:10 pm – 4:30 pm
Presentation

Bulgaria's Science, Technology and Innovation Performance: Preliminary Findings
Anwar Aridi, Senior Private Sector Specialist, World Bank

4:30 pm – 4:55 pm
Q&A

4:55 pm – 5:00 pm
Closing remarks

Participating Organizations

Organization
Council of Ministers
Ministry of education and science
Executive Agency Operational Programme Science and Education for Smart Growth (EA OPSESG)